CHAPTER 1 _ INTRODUCTION

MACHINE LEARNING

Machine Learning is a branch of Artificial Intelligence where computer learns from the data(past experiences) and makes future prediction. It finds the pattaern in data, based on pattern it predicts for unseen data.
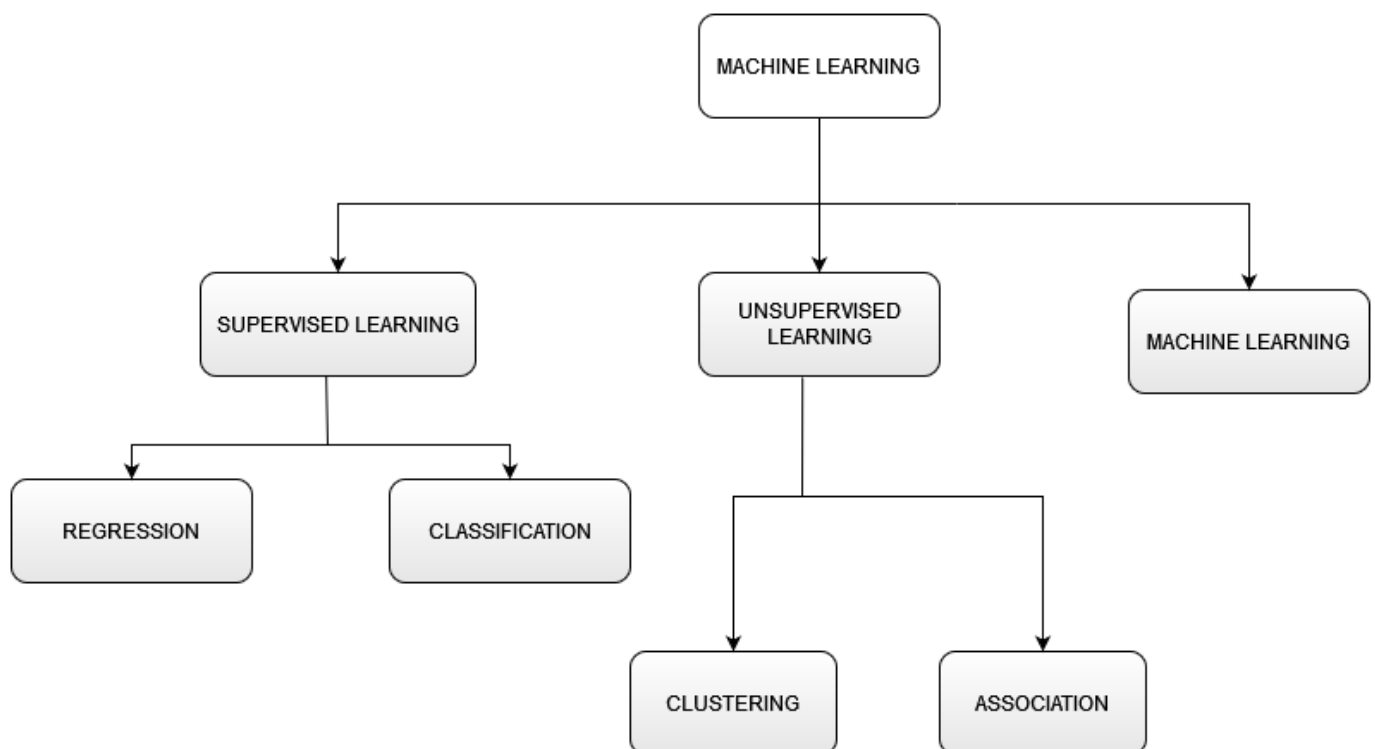
Application

1. Image Recognition

2. Speech Recognition

3. Product Recommendation

4. Sentimental Analysis

5. Language Translation

Machine Learning is used in many industries like Banking sectors, health care sctor, OTT platforms etc.

Machine Learning is classified into three types :

1. Supervised Learning

2. Unsupervised Learning

3. Reinforcement Learning

1. Supervised Learning

Supervised Learning algorithms learns from labelled input data, where labelled input data associated with output responses that consists of numeric values or string labels.

Depending on type of ouput variable supervised learning classified into two types:

1. Regression

2. Classification

1. Regression :

If output variable is continuous then these type of problems can be considered as regression type.

Example :

1. Predicting salary of person based on past experience of person.

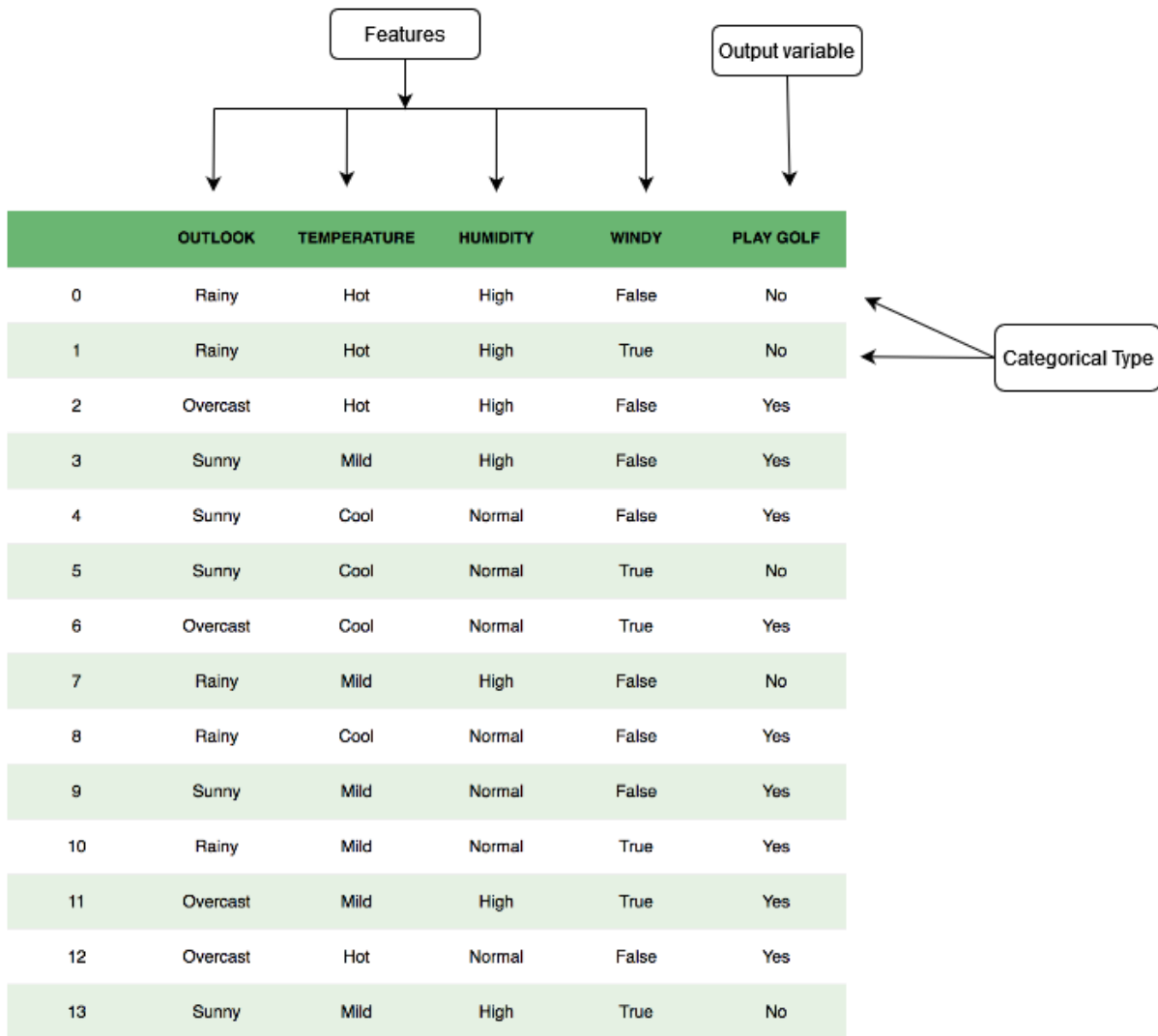2. Predicting house price based on house details.

	YearsExperience	Salary
16	5.1	66029.0
20	6.8	91738.0
8	3.2	64445.0
6	3.0	60150.0
4	2.2	39891.0
21	7.1	98273.0
7	3.2	54445.0
29	10.5	121872.0
19	6.0	93940.0
11	4.0	55794.0
23	8.2	113812.0
1	1.3	46205.0
0	1.1	39343.0
25	9.0	105582.0
2	1.5	37731.0

2. Classification

If output variable is categorical then these type of problems can be considered as classification type.

Example :

1. Predicting incoming mail is spam or not spam.
2. predicting whether loan should be accept or reject based on credict score of incoming loan application.

	OUTLOOK	TEMPERATURE	HUMIDITY	WINDY	PLAY GOLF
0	Rainy	Hot	High	False	No
1	Rainy	Hot	High	True	No
2	Overcast	Hot	High	False	Yes
3	Sunny	Mild	High	False	Yes
4	Sunny	Cool	Normal	False	Yes
5	Sunny	Cool	Normal	True	No
6	Overcast	Cool	Normal	True	Yes
7	Rainy	Mild	High	False	No
8	Rainy	Cool	Normal	False	Yes
9	Sunny	Mild	Normal	False	Yes
10	Rainy	Mild	Normal	True	Yes
11	Overcast	Mild	High	True	Yes
12	Overcast	Hot	Normal	False	Yes
13	Sunny	Mild	High	True	No

Supervised Learning Algorithms

1. Linear Regression
2. Logistic Regression
3. k-Nearest Neighbour
4. Support vector Machine
5. Decision Tress
6. Ensemble Learning
7. Naive Bayes Algorithm

2. Unsupervised Learning

If ML learns from unlabelled data, where data is not associated with target response.

Algorithms

1. Clustering Algorithms

2. Association clustering

3. Reinforcement Learning

Reinforcement learning differs from the supervised learning in a way that in supervised learning the training data has the answer key with it so the model is trained with the correct answer itself whereas in reinforcement learning, there is no answer but the reinforcement agent decides what to do to perform the given task.

Terminologies used in Machine Learning

- **Model** : A model is a specific representation learned from data by applying some machine learning algorithm. A

model is also called hypothesis.

- **Feature** : A feature is an individual measurable property of our data. A set of numeric features can be conveniently described by a feature vector. For example, in order to predict a fruit, there may be features like color, smell, taste, etc.

- **Target (Label)** : A target variable or label is the value to be predicted by our model. For the fruit example discussed in the features section, the label with each set of input would be the name of the fruit like apple, orange, banana, etc.
- **Training** : The idea is to give a set of inputs(features) and it's expected outputs(labels), so after training, we will have a model (hypothesis) that will then map new data to one of the categories trained on.
- **Prediction** Once our model is ready, it can be fed a set of inputs to which it will provide a predicted output(label).